



# Oxygen sensors may improve our air

By NED ROZELL

Replacing oxygen sensors in cars and trucks may make the air in Alaska's cities cleaner. Oxygen sensors are devices the size and shape of a spark plug. They sniff a vehicle's exhaust and tell the engine to adjust the fuel/air mixture so the car or truck runs clean.

Oxygen sensors in many Alaska cars and trucks are not working properly, according to the Alaska Department of Environmental Conservation, which is funding a study to determine the extent of the problem. If replacing oxygen sensors can reduce carbon monoxide emissions, Anchorage and Fairbanks might have an easier time meeting air quality standards set by the Environmental Protection Agency.

Air-quality specialists completed the first phase of testing and are planning a second phase in January 2003 in Fairbanks. For the study, they are looking for volunteers who own cars or light trucks built from 1985 to 1992. Testers will



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**A small exhaust part may have a large effect on the air quality of Fairbanks.**

monitor emissions from the vehicles before and after installing new oxygen sensors. Volunteers will receive free oxygen sensors and the use of a vehicle or paid compensation for the two to four days the researchers will need the vehicle.

"I think that overall there's a lot of vehicles out there for which the replacement of an oxygen sensor can be beneficial for CO emissions and less fuel consumption," said Glenn Miller, the IM program manag-

er for the Fairbanks North Star Borough. Kelly Shaw, an IM referee and mechanic for the borough, checked the oxygen sensors on 20 vehicles during the first phase of the study. He found that more than half of them needed replacement.

Installed in cars and trucks since the mid-1980s, oxygen sensors sample the amount of residual oxygen in exhaust and provide constant feedback that helps the engine fine-tune its air/fuel mixture. When the sensor is working well, it helps

reduce emissions of hydrocarbons (from unburned fuel), nitrogen oxides, and carbon monoxide.

Carbon monoxide, which emits mostly from incomplete fuel combustion in gasoline-powered cars and trucks, is of particular interest to urban Alaskans. Anchorage and Fairbanks are two of the cities in Alaska that the EPA monitors for emissions of CO, a colorless, odorless gas that limits a person's ability to process oxygen. Anchorage and Fairbanks violated the EPA's standards of 9 parts per million of carbon monoxide many times in the 1970s and 1980s. Bad air days have become rare with newer cars on the road and the use of oxygenated fuel in Anchorage from November through March, but the location of both cities in natural bowls combined with temperature inversions make Anchorage and Fairbanks vulnerable to violating EPA standards.

Oxygen sensors for most vehicles cost less than \$100, Miller said, but not many back-

yard mechanics have developed the habit of changing them.

"Oxygen sensors have a lifespan, like tires and oil," he said. "Someone who can replace their own sparkplugs can replace an oxygen sensor."

The Fairbanks study of oxygen sensors will probably take place in mid-January, said Frank Di Genova, the physics and environmental science vehicle lab director of Sierra Research in Sacramento, Calif. Sierra Research also was involved in a study of cold-weather vehicle performance in Fairbanks two winters ago. Di Genova and the borough are now looking for about 50 cars and light trucks of vintage 1985-1992. If you would like to volunteer your vehicle for the study, call Karen Wilken at 452-5688, ext. 228.

This column is provided as a public service by the Geophysical Institute, University of Alaska Fairbanks, in cooperation with the UAF research community. Ned Rozell is a science writer at the institute. He can be reached by email at [nrozell@dino.gi.alaska.edu](mailto:nrozell@dino.gi.alaska.edu).